APPROVED

by Head of Academic Council

Igor Sikorsky Kyiv Polytechnic Institute

_____ Mykhaylo ILCHENKO

_____ 2021

MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE

National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute"

CURRICULUM

(Enrolment 2021)

Level Bachelor

Speciality 153 Micro- and Nanosystem Engineering

Educational and Professional program Micro- and Nanoelectronics

Graduation Department Microelectronics Department

Form of study full-time (full-time, part-time)

Faculty (Institute) Faculty of Electronics

Qualification Bachelor in Micro- and Nanosystem Engineering

Study duration 3 years 10 months

Base level Full Secondary Education

I. Schedule of educational process

YEAR	September				October					November					December				January				February				March					April				May				June				July					August			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52
I																			E	E	H	H																			E	E	H	H	H	H	H	H	H	H	H	H
II																			E	E	H	H																			E	E	H	H	H	H	H	H	H	H	H	H
III																			E	E	H	H																			E	E	H	H	H	H	H	H	H	H	H	H
IV																			E	E	H	H										E	P	P	P	P	P	R	R	R	R	A	A								

Symbols: Learning period; E Examination; P Practice; R Research; A Assessment; H Holiday

II. Summary table of time budget (Weeks)

YEAR	Learning period	Examination	Practice	Assessment	Research	Holiday	Total
I	36	4				12	52
II	36	4				12	52
III	36	4				12	52
IV	27	3	5	4	2	2	43

III. Practice

Type of practice	YEAR	Weeks
Pre-diploma Practice	8	5

IV. Graduates assessment

Subjects	Form of graduates assessment (exam, graduation project)	YEAR
Bachelor Thesis Implementation	Bachelor's Thesis Defense	8

V. Plan of Educational process

Code	educational components	Distribution for terms (semesters)				ECTS Credits	Number of hours				
		Exams	Final tests	Individual task	Module test		Total	Lectures/practical lessons: Lectures	Practical	Laboratory	Self-study
1	2	3	4	5	6	7	8	9	10	11	12
1. Compulsory educational components											
1.1. General training cycle											
1.1.1	Ukrainian for Specific Purposes		1		1	2	60	18	18		24
1.1.2	History of Science and Technology		2		2	2	60	18	18		24
1.1.3	Fundamentals of Healthy Lifestyle		2		1,2	3	90	18	54		18
1.1.4	Foreign Language		2, 4		1,3	6	180		144		36

1.1.5	Economics and Production Organization		7		7	4	120	36	36		48
1.1.6	Labor Safety and Civil Defence		7		7	4	120	36	28	8	48
1.1.7	Philosophical Foundations of Scientific Cognition		4		4	2	60	18	18		24
1.1.8	Environmental Safety of Engineering		3		3	2	60	18	18		24
1.1.9	Business Law		6		6	2	60	18	18		24
1.1.10	Foreign Language for for Specific Purposes	8	6		5,7	6	180		126		54
1.1.11	Analytic Geometry	1		1	1	4,5	135	36	36		63
1.1.12	Mathematical Analysis	1,2,3		2,3	1,2,3	16,5	495	126	144		225
1.1.13	Physics	1,2		1,2	1,2	11	330	108	54	18	150
1.1.14	Informatics		1,2	1,2	1,2	10	300	72		108	120
	Total number of part 1.1	7	13	7	21	75	2250	522	712	134	882
	1.2. Vocational training cycle										
1.2.1	Introduction into Measuring Engineering		1	1	1	5	150	36	18	18	78
1.2.2	Materials and Components of Micro and Nanosystems Engineering		2	2	2	4	120	36		18	66
1.2.3	Engineering Graphics	2		2	2	4	120	18	18	18	66
1.2.4	Fundamentals of Quantum Theory	3		3	3	5	150	54	18		78
1.2.5	Calculus		3	3	3	5	150	36		36	78
1.2.6	Statistical Methods of Data Processing	3		3	3	4	120	36	18		66
1.2.7	Electronics Circuits Theory	4	3	3	3,4	11,5	345	108	36	36	165
1.2.8	Coursework in Electronics Circuits Theory		4			1	30				30
1.2.9	Chemistry of Electronic Materials		4	4	4	5,5	165	54		36	75
1.2.10	Condensed Matter Physics	4		4	4	6	180	54	18	18	90
1.2.11	Semiconductor Electronics	4		4	4	6	180	54	18	18	90
1.2.12	Electrodynamics	5			5	5	150	54	18		78
1.2.13	Coursework in Electrodynamics		5			1	30				30
1.2.14	Nanoelectronics	5		5	5	6	180	54	36		90
1.2.15	Signal and Systems Theory		5	5	5	4,5	135	36	18	18	63
1.2.16	Technological Fundamentals of Electronics	5		5	5	4	120	36		18	66
1.2.17	Circuit Engineering	6,7			6,7	14	420	90	54	72	204
1.2.18	Course Project in Circuit Engineering		7			1,5	45				45
1.2.19	Pre-diploma Practice		8			6	180				180
1.2.20	Bachelor Thesis					6	180				180
	Total number of part 1.2	11	10	13	17	105	3150	756	270	306	1818
	TOTAL IN NORMATIVE educational components	18	23	20	38	180	5400	1278	982	440	2700
	2. Optional educational components										
	2.1. General training cycle (Optional subjetcs from University catalogue)										
2.1.1	Educational component 1 U-catalogue		4		4	2	60	18	18		24
2.1.2	Educational component 2 U-catalogue		4		4	2	60	18	18		24

	Total number of part 2.1		2		2	4	120	36	36		48
2.2. Vocational training cycle (Optional subjetcs from Faculty catalogue)											
2.2.1	Educational component 1 F-catalogue*		5	5	5	4	120	36	18		66
2.2.2	Educational component 2 F-catalogue*		5	5	5	4	120	36	18		66
2.2.3	Educational component 3 F-catalogue*		6	6	6	4	120	36	18		66
2.2.4	Educational component 4 F-catalogue*		6	6	6	4	120	36	18		66
2.2.5	Educational component 5 F-catalogue*		6	6	6	4	120	36	18		66
2.2.6	Educational component 6 F-catalogue*		6	6	6	4	120	36	18		66
2.2.7	Educational component 7 F-catalogue*		6	6	6	4	120	36	18		66
2.2.8	Educational component 8 F-catalogue*		7	7	7	4	120	36	18		66
2.2.9	Educational component 9 F-catalogue*		7	7	7	4	120	36	18		66
2.2.10	Educational component 10 F-catalogue*		7	7	7	4	120	36	18		66
2.2.11	Educational component 11 F-catalogue*		8	8	8	4	120	36	18		66
2.2.12	Educational component 12 F-catalogue*		8	8	8	4	120	36	18		66
2.2.13	Educational component 13 F-catalogue*		8	8	8	4	120	36	18		66
2.2.14	Educational component 14 F-catalogue*		8	8	8	4	120	36	18		66
	Total number of part 2.2		14	14	14	56	1680	504	252		924
	TOTAL IN SELECTIVE educational components		16	14	16	60	1800	540	288		972
	TOTAL	18	39	34	54	240	7200	1818	1270	440	3672

* The distribution of classroom hours between laboratory and practical Elective educational components from the faculty / department catalogs is carried out depending on the chosen discipline.

Approved by University Academic Council, Meeting protocol № __ from _____ 2021

Head of the Microelectronics Department _____/ Anatolii ORLOV /

Dean of the Faculty of Electronics _____ / Valery ZHUIKOV/

MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE

National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute"

CURRICULUM

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Igor Sikorsky Kyiv Polytechnic Institute

_____ Mykhaylo ILCHENKO

_____ 2021

Level Master

Speciality 153 Micro- and Nanosystem Engineering

Educational and Professional program Micro- and Nanoelectronics

Graduation Department Microelectronics Department

Form of study full-time (full-time, part-time)

Faculty (Institute) Faculty of Electronics

Qualification Master in Micro- and Nanosystem Engineering

Study duration 1 year 4 months

Base level Bachelor degree

I. Schedule of educational process

YEAR	September				October					November					December				January				February				March					April					May				June				July					August			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52
I																			E	E	H	H																			E	E	H	H	H	H	H	H	H	H	H	H
II	P	P	P	P	P	P	P	P	R	R	R	R	R	R	R	A	A	A																																		

Symbols: Learning period; E Examination; P Practice; R Research; A Assessment; H Holiday

II. Summary table of time budget (Weeks)

YEAR	Learning period	Examination	Practice	Assessment	Research	Holiday	Total
I	38	4				12	52
II			8	3	7		18

III. Practice

Type of practice	YEAR	Weeks
Diploma Practice	3	8

IV. Graduates assessment

Subjects	Form of graduates assessment (exam, graduation project)	YEAR
Master's Thesis Implementation	Master's Thesis Defense	3

V. Plan of Educational process

Code	educational components	Distribution for terms (semesters)				ECTS Credits	Number of hours				
		Exams	Final tests	Individual task	Module test		Total	Lectures/practical lessons			Self-study
								Lectures	Practical	Laboratory	
1	2	3	4	5	6	7	8	9	10	11	12
1. Compulsory educational components											
1.1. General training cycle											
1.1.1	Patenting and Intellectual Property		2		2	3	90	36	18		36
1.1.2	Foundations of sustainable development		2		2	2	60	18	18		24
1.1.3	Foreign Language Scientific Communication Practicum		2	1	1	3	90		72		18
1.1.4	Startup Projects Management		1		1	3	90	18	36		36
	Total number of part 1.1		4	1	4	11	330	72	144		114

1.2. Vocational training cycle											
1.2.1	Nanomaterials and Nanotechnologies	1		1	1	5	150	36	36		78
1.2.2	Devices based on Nanosized and Quantum Effects		1	1	1	5	150	36	36		78
1.2.3	Electronic Sensors	1		1	1	5	150	36		36	78
1.2.4	Design of Semiconductor Devices and Integrated Circuits	1			1	7	210	54	54		102
1.2.5	Course Project in Design of Semiconductor Devices and Integrated Circuits		1			1,5	45				45
1.2.6	Scientific Research		1, 2			6,5	195	9	36		150
1.2.7	Diploma Practice		3			14	420				420
1.2.8	Qualifying Master Thesis					12	360				360
	Total number of part 1.2	3	5	3	4	56	1680	171	162	36	1311
	TOTAL IN NORMATIVE educational components	3	9	4	8	67	2010	243	306	36	1425
2. Optional educational components											
2.2. Vocational training cycle (Optional subjetcs from Faculty catalogue)											
2.2.1	Educational component 1 F-catalogue*	2		2	2	5	150	36	18		96
2.2.2	Educational component 2 F-catalogue*	2		2	2	5	150	36	18		96
2.2.3	Educational component 3 F-catalogue*	2		2	2	5	150	36	18		96
2.2.4	Educational component 4 F-catalogue*		2	2	2	4	120	36	18		66
2.2.5	Educational component 5 F-catalogue*		2	2	2	4	120	36	18		66
	Total number of part 2.2	3	2	5	5	23	690	180	90		420
	TOTAL IN SELECTIVE educational components	3	2	5	5	23	690	180	90		420
	TOTAL	6	11	9	13	90	2700	423	396	36	1845

* The distribution of classroom hours between laboratory and practical Elective educational components from the faculty / department catalogs is carried out depending on the chosen discipline.

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Head of the Microelectronics Department _____/ Anatolii ORLOV /

Dean of the Faculty of Electronics _____ / Valery ZHUIKOV/

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CURRICULUM

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_____ Mykhaylo ILCHENKO

_____ 2021

Level Master

Speciality 153 Micro- and Nanosystem Engineering

Educational and Scientific program Micro- and Nanoelectronics

Graduation Department Microelectronics Department

Form of study full-time (full-time, part-time)

Faculty (Institute) Faculty of Electronics

Qualification Master in Micro- and Nanosystem Engineering

Study duration 1 year 9 months

Base level Bachelor degree

I. Schedule of educational process

YEAR	September				October					November					December				January				February				March					April					May				June				July					August			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52
I																			E	E	H	H																		E	E	H	H	H	H	H	H	H	H	H	H
II																			E	E	H	H	P	P	P	P	P	P	R	R	R	R	R	R	R	R	A	A												

Symbols: Learning period; E Examination; P Practice; R Research; A Assessment; H Holiday

II. Summary table of time budget (Weeks)

YEAR	Learning period	Examination	Practice	Assessment	Research	Holiday	Total
I	38	4				12	52
II	18	2	6	2	9	2	39

III. Practice

Type of practice	YEAR	Weeks
Scientific and Research	4	6

IV. Graduates assessment

Subjects	Form of graduates assessment (exam, graduation project)	YEAR
Master Thesis Implementation	Master's Thesis Defense	4

V. Plan of Educational process

Code	educational components	Distribution for terms (semesters)				ECTS Credits	Number of hours				
		Exams	Final tests	Individual task	Module test		Total	Lectures/practical lessons			Self-study
								Lectures	Practical	Laboratory	
1	2	3	4	5	6	7	8	9	10	11	12
1. Compulsory educational components											
1.1. General training cycle											
1.1.1	Patenting and Intellectual Property		2		2	3	90	36	18		36
1.1.2	Foundations of sustainable development		2		2	2	60	18	18		24
1.1.3	Foreign Language Scientific Communication Practicum		2, 3	1	1,3	4,5	135		108		27
1.1.4	Startup Projects Management		1		1	3	90	18	36		36
1.1.5	Pedagogic Excellence		3		3	2	60	18	18		24
1.1.6	Mathematical Optimization Methods	3			3	4	120	36	18		66

1.1.7	Mathematical Modeling of Systems and Processes	3		3	3	4	120	36	18		66
	Total number of part 1.1	2	6	2	8	22,5	675	162	234		279
	1.2. Vocational training cycle										
1.2.1	Nanomaterials and Nanotechnologies	1		1	1	5	150	36	36		78
1.2.2	Devices based on Nanosized and Quantum Effects		1	1	1	5	150	36	36		78
1.2.3	Electronic Sensors	1		1	1	5	150	36		36	78
1.2.4	Design of Semiconductor Devices and Integrated Circuits	1			1	7	210	54	54		102
1.2.5	Course Project in Design of Semiconductor Devices and Integrated Circuits		1			1,5	45				45
1.2.6	Microwave Spectroscopy of Solids	3		3	3	6	180	36	36		108
1.2.7	Scientific Research		1,2,3			11	330	9	54		267
1.2.8	Scientific and Research Practice		4			10	300				300
1.2.9	Qualifying Master Thesis					16	480				480
	Total number of part 1.2	4	6	4	5	66,5	1995	207	216	36	1536
	TOTAL IN NORMATIVE educational components	6	12	6	13	89	2670	369	450	36	1815
	2. Optional educational components										
	2.2. Vocational training cycle (Optional subjetcs from Faculty catalogue)										
2.2.1	Educational component 1 F-catalogue*	2		2	2	5	150	36	18		96
2.2.2	Educational component 2 F-catalogue*	2		2	2	5	150	36	18		96
2.2.3	Educational component 3 F-catalogue*	2		2	2	5	150	36	18		96
2.2.4	Educational component 4 F-catalogue*		2	2	2	4	120	36	18		66
2.2.5	Educational component 5 F-catalogue*		2	2	2	4	120	36	18		66
2.2.6	Educational component 6 F-catalogue*		3	3	3	4	120	36	18		66
2.2.7	Educational component 7 F-catalogue*		3	3	3	4	120	36	18		66
	Total number of part 2.2	3	4	7	7	31	930	252	126		552
	TOTAL IN SELECTIVE educational components	3	4	7	7	31	930	252	126		552
	TOTAL	9	16	13	20	120	3600	621	576	36	2367

* The distribution of classroom hours between laboratory and practical Elective educational components from the faculty / department catalogs is carried out depending on the chosen discipline.

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Head of the Microelectronics Department _____/ Anatolii ORLOV /

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National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute"

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Head of Academic Council

_____ Mykhaylo ILCHENKO

Level PhD

Speciality 153 Micro- and Nanosystem Engineering

Educational and Scientific program Micro- and Nanosystem Engineering

Form of study full-time (full-time, part-time)

Qualification PhD in Micro- and Nanosystem Engineering

Study duration 4 years

Base level Master degree

Educational component 40 ECTS Credits

Schedule of study

YEAR	October					November				December					January				February				March				April					May				June				July					August				September			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52
I														E	E	E	R	R	RT	RT	RT															E	E	R	H	H	H	H	H	H	H	H	H	R	RT	RT	RT
II												I	I	E	E	E	R	R	RT	RT	RT															E	E	R	H	H	H	H	H	H	H	H	H	R	RT	RT	RT
III	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	RT	RT	RT	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	H	H	H	H	H	H	H	H	H	R	RT	RT	RT
IV	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	RT	RT	RT	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	H	H	H	H	H	H	H	H	H	R	RT	RT	RT

Symbols: Learning period; E Examination; I Internship; R Research; RT Report; A Assessment; H Holiday

I. Educational component

Summary table of time budget (Weeks)

YEAR	Learning period	Examination	Internship	Holiday	Total
I	28	5		9	42
II	26	5	2	9	42

Internship

Type of Internship	YEAR	Weeks
Pedagogical Practice	3	2

Plan of Educational process

Code	Educational components	Distribution for terms (semesters)				ECTS Credits	Number of hours				
		Exams	Final tests	Individual task	Module test		Total	Lectures/practical lessons: Lectures	Practical	Laboratory	Self-study
1	2	3	4	5	6	7	8	9	10	11	12
1. Normative components											
1.1. General training cycle											
1.1.1	Nanomaterials and Methods for their Research		3	3	3	3	90	26	13		51
1.1.2	Micro- and Nanocomponents and Systems		4		4	3	90	18	18		54

1.1.3	Micro- and Nanoelectronics Devices Simulation		3	3	3	3	90	26	13		51
1.1.4	Signal Theory in Micro- and Nanosystem Engineering		4		4	3	90	18	18		54
1.1.5	Philosophical Principles of Scientific Activity	2	1	2	1	6	180	31	49		100
1.1.6	Foreign Language for Scientific Activity	2	1	1	2	6	180		75		105
1.2. Vocational training cycle											
1.2.1	Organization of Scientific and Innovative Activities	2		2	2	4	120	36	36		48
1.2.2	Pedagogical Practice		3			2	60				60
	TOTAL of NORMATIVE educational components	3	7	5	7	30	900	155	222		523
2. Elective components											
2.1	Educational component 1 F-catalogue	3			3	5	150	26	26		98
2.2	Educational component 2 F-catalogue	4		4	4	5	150	36	18		96
	TOTAL of ELECTIVE educational components	2		1	2	10	300	62	44		194
	TOTAL	5	7	6	9	40	1200	217	266		717

II. Scientific component

YEAR	The content of the graduate student's scientific work	Forms of control (Reporting)
1st year	The choice of the topic of the graduate student's dissertation, the formation of an individual work plan of the graduate student; execution of the dissertation work under the guidance of the scientific supervisor; preparation and submission for publication of at least 1 publication on the topic of the dissertation in accordance with current requirements.	Approval at the Academic Council of the Institute / Faculty by 30.11.2020, reporting on the progress of the individual plan of the graduate student twice a year.
2nd year	Execution under the guidance of the supervisor of the dissertation; preparation and submission for publication of at least 1 publication on the topic of the dissertation in accordance with current requirements.	Reporting on the progress of the individual graduate student's plan twice a year.
3rd year	Execution under the guidance of the supervisor of the dissertation; preparation and submission for publication of at least 1 publication on the topic of the dissertation in accordance with current requirements.	Reporting on the progress of the individual graduate student's plan twice a year.
4th year	Completion of the dissertation, summarizing the results of publications (at least three) on the topic of the dissertation in accordance with current requirements. Submission of documents for preliminary examination of the dissertation. Graduation certification.	Reporting on the progress of the individual plan of the graduate student twice a year Providing an opinion on the scientific novelty, theoretical and practical significance of the dissertation results. PhD thesis defense.

Head of the Scientific and Methodical Board of Speciality_____ / Volodymyr TIMOFEYEV/

Guarantor of the Educational and Scientific program _____/ Volodymyr TIMOFEYEV /